



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

RECEIVED

In re the application of:
ROBERT HUUSKEN

Docket: ZOU-6

APR 05 2004

TC 1700

Serial Number: 09/878,254

Group Art Unit: 1711

Filed: June 11, 2001

Examiner: Travis B. Ribar

For: FLAME RETARDANT RESIN COATING

BRIEF FOR APPELLANT

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

This is an Appeal to the Board of Patent Appeals and Interferences from the Final Rejection of claims 1-24 mailed August 26, 2003 in the above identified case. A Notice of Appeal was filed on February 25, 2004. An oral hearing is not requested.

This Brief is filed in triplicate. A credit card authorization for the required appeal brief fee of \$330.00 is enclosed. In the event that the Commissioner determines that an additional extension of time is required in order for this submission to be timely, it is requested that this submission include a petition for an additional extension for the required length of time and the Commissioner is authorized to charge any other fees necessitated by this paper to Deposit Acct. No. 18-1589.

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I. REAL PARTY IN INTEREST

The real party in interest is Trespa International B.V., the assignee of record.

II. RELATED APPEALS AND INTERFERENCES

With respect to other appeals or interferences that will directly affect, or be directly affected by, or have a bearing on the Board's decision in this appeal, please note that there are no other related applications on appeal or subject to an interference known to appellant, appellant's legal representative or the assignee.

III. STATUS OF CLAIMS

The claims in the application are 1-24. Claims 1-24 are pending, stand rejected and are on appeal. No claims are allowed.

IV. STATUS OF AMENDMENTS

A response was filed after final rejection on November 25, 2003, which was considered by the Examiner but was not deemed to overcome the rejection as per the Examiner's Advisory Action, dated January 5, 2004. Pursuant to a telephone interview on January 29, 2004, the Examiner has agreed to enter an amendment to Claim 20 after final rejection, which amendment is filed herewith. This amendment is for the purpose of placing the claims in better condition for appeal and to remove a pending 35 U.S.C. 112 second paragraph rejection. Claim 20 in the appendix reflects the amendment submitted herewith.

V. SUMMARY OF THE INVENTION

The invention described and claimed herein relates to flame retardant resin coatings.

These coatings are suitable for application to articles exposed to outdoor weathering, such as the exterior cladding of buildings or the like. Such resin coatings exhibit superior, substantially constant color properties and, even with small fractions of phosphorus compounds, offer high flame retardancy.

The embodiment of the invention as claimed includes a flame retardant resin coating comprising a flame retardant base resin and a transparent resin top layer, wherein the base resin comprises color pigments and from about 2.5 to about 50% by weight, based on the weight of the base resin, of at least one flame retardant additive selected from the group consisting of melamine polyphosphates, melamine pyrophosphates, ammonium polyphosphates, and mixtures thereof; and wherein the transparent resin comprises from about 0.5 to about 2% by weight, based on the weight of the transparent resin, of at least one sterically hindered amine. The invention further claims an article comprising a substrate, and the flame retardant resin coating on the substrate.

VI. ISSUES

(a) Whether Claims 1-15 and 21-24 are unpatentable under 35 U.S.C. 103(a) over Von Bonin '527 in view of either Valet et al. or Susi, and also in view of the Appellant's disclosure in the specification.

(b) Whether Claims 16 and 18-20 are unpatentable 35 U.S.C. 103(a) over Von Bonin '527 in view of either Valet et al. or Susi, also in view of the Appellant's disclosure in the specification and further in view of WO 96/07678.

(c) Whether Claims 16 and 18-20 under 35 U.S.C. 103(a) over Von Bonin '527 in view of either Valet et al. or Susi, also in view of the Appellant's disclosure in the specification and further in view of Japanese publication JP 402178359A to Kawakami et al.

VII. GROUPING OF CLAIMS

The claims do not all stand or fall together. The claims within each of the following groups for decision stand or fall together for the following reasons:

Group I: Claim 1, the first independent article claim, drawn to a flame retardant resin coating.

Group II: Claims 2-4, relating to suitable materials for the base resin of the flame retardant resin coating.

Group III: Claim 5, relating to the amount by weight of UV absorber material which is present in the transparent resin.

Group IV: Claims 6-7, relating to suitable melamine polyphosphates for the flame retardant additive.

Group V: Claim 8, relating to suitable dimelamine pyrophosphates for the flame retardant additive.

Group VI: Claim 9, relating suitable dimelamine orthophosphates for the flame retardant additive.

Group VII: Claim 10, relating to suitable monomelamine orthophosphates for the flame retardant additive.

Group VIII: Claim 11, relating to the water solubility of a resin which encapsulates ammonium polyphosphate particles.

Group IX: Claim 12, relating to the phosphorus content of the flame retardant additives.

Group X: Claims 13-15, relating to suitable UV absorber materials.

Group XI: Claims 16-20, relating to the preparation of polyurethane (meth)acrylate.

Group XII: Claims 21-22, relating to suitable flame retardant additive materials for the base resin.

Group XIII: Claim 23, relating to the presence of color pigments in the base coating material.

Group XIV: Claim 24, drawn to an article comprising a substrate having a flame retardant resin coating of the invention thereon.

VIII. ARGUMENTS

In the final rejection of August 26, 2003, the Examiner rejected claim 20 under 35 U.S.C. 112, second paragraph, as being indefinite. Pursuant to a telephone interview on January 29, 2004, the Examiner has agreed to enter an amendment to Claim 20 after final rejection, which amendment is filed herewith. Accordingly, the Examiner has agreed to remove the 35 U.S.C. 112 rejection of Claim 20 pursuant to the above amendment.

The Examiner has rejected claims 1-15 and 21-24 under 35 U.S.C. 103(a) over Von Bonin '527 in view of either Valet et al. or Susi, and also in view of the Appellant's disclosure in the specification. The present invention relates to a flame retardant resin coating composition comprising a flame retardant base resin as a first layer and a transparent resin top layer as a second layer. Both layers comprise specific components, i.e. the base resin comprises color pigments and from about 2.5 to about 50%, based on the weight of the base resin, of at least one flame retardant. The transparent resin top layer comprises from about 0.5 to about 2% by weight, based on the weight of the transparent resin, of at least one sterically hindered amine.

The structure is a key feature of the present invention, because it can provide a colored resin coating which can withstand severe weather conditions and which has a high resistance to fire. Appellants urge that such a composition is neither taught nor suggested in any of the references, either alone or in combination.

It is respectfully submitted that the weathering stability of the flame retardant resin coating is influenced by the amount of flame retardant additives in the base resin in that the susceptibility of the coating to UV irradiation, hydrolysis, and other weathering phenomena is increased. In order to counter this unwanted increase in susceptibility, it is particularly important to strengthen the resistance to UV radiation to improve weathering stability. This is done by the addition of the UV absorbers described by Appellant in a transparent layer which covers the base resin of the resin coating. Particularly, UV radiation is able directly to break chemical bonds in the polymers since the photon energy, which is a function of the wavelength, falls within the range of chemical bond energy. In the absence of oxygen, the free radicals which are formed result in chemical cross linking. In the presence of oxygen, photo oxidation occurs, and may be initiated even by visible light. This gives rise to a cyclical chain reaction which yields a hydroperoxide which is present in the polymer chain and may lead to chain scission. The free radicals formulated in the chain reaction may be deactivated by primary stabilizers, which, for example, comprise sterically hindered phenols and amines. These are able to form highly stable free radicals which are unable to initiate chain reactions and which instead, conversely, scavenge the aggressive peroxy radicals. Particularly effective are sterically hindered amines, also called HALS (hindered amine light stabilizers), in which the nitrogen is incorporated in a cycloaliphatic piperidyl ring. The sterically hindered amines provide steric shielding of free radicals which are scavenged.

U.S. patent 4,740,527 to von Bonin relates to optionally porous intumescent masses containing carbonization auxiliaries, fillers and optionally other auxiliary agents, obtainable by the reaction of isocyanate-reactive compounds, optionally containing phosphorus or boron with polyisocyanates, in the presence of polyepoxides. Fire retarding panels or wall elements may be produced by applying the coatings to a panel or

supporting construction. However, as the Examiner admits, von Bonin does not include any transparent resin top layer that the Appellant claims. Importantly, there is no suggestion from Von Bonin that one could or should apply any coating at all on his fire-resistant coating. More particularly, there is no suggestion that one could or should apply a transparent layer thereto, which transparent layer comprises from about 0.5 to about 2% by weight of at least one sterically hindered amine.

The Examiner attempts to fill the void in von Bonin by citing Valet et al. ('067) or alternatively Susi ('956). U.S. patent 5,298,067 to Valet et al. relates to a coating material stabilized against the degradation induced by light, oxygen and heat which includes a sterically hindered amine. The subject of this patent includes a method of stabilizing a coating material against the deleterious effects of light, oxygen and heat, which method comprises adding to said coating material at least one hydroxyphenyltriazine of their formula I. The function of their stabilizer is to stabilize the coating material itself against the effects of light, oxygen and heat, and not to protect the substrate or any layer beneath it from degradation due to light or environmental effects. There is no suggestion that the Valet, et al coating material could or should be applied to a flame retardant base resin as a first layer.

U.S. Patent 4,619,956 (Susi) relates to synergistic combinations of hindered amine light stabilizers (HALS) and ultraviolet absorbers (UVA). Susi provides a method of stabilizing a polymer against the action of light, moisture, and oxygen comprising *incorporating in said polymer* a stabilizing and synergistically effective amount of their components A and B. Therefore, the protective layer provided by Susi is not to protect the substrate and any base resin layer beneath it from degradation due to light or environmental effects. As one can read in column 1, line 11-15, the use of HALS and UVA individually or in combination to stabilize synthetic resins, plastics and the lacquers and coatings *made therefrom* against light degradation is known. Again, there is no suggestion that the Valet, et al coating material could or should be applied to a flame retardant base resin as a first layer.

Importantly, no combination of applied prior art suggests a *two-layered* flame retardant resin coating *structure* comprising a flame retardant base resin layer and a transparent resin top layer on the base layer wherein

- (a) the underlying base resin comprises color pigments and at least one flame retardant additive selected from the group consisting of melamine polyphosphates, melamine pyrophosphates, ammonium polyphosphates, and mixtures thereof; and
- (b) wherein the transparent top resin layer comprises at least one sterically hindered amine.

In forming the rejection, the Examiner individually identifies a first reference having a pigment and flame retardant; and a second reference which shows a mixture of a resin with a sterically hindered amine. However, there is no suggestion that a combination of these layers could or should be formed to achieve the claimed invention. In effect, the examiner shows parts of the invention but not the invention as a whole. She leaps to the conclusion that, in effect, all features of the present invention are therefore *prima facie* obvious. This is certainly not the case and it is submitted that no *prima facie* case of obviousness has been asserted in the first instance. There is nothing in the art to suggest the compatibility of the individual layers, the adherability of one to the other, the non-detrimental reactivity of the individual layers, nor the benefits actually achieved as described in the instant specification.

A careful reading of each of Valet, et al and Susi fails to teach or suggest that their coatings can or should be applied to any flame retardant base, much less a base having a flame retardant additive selected from the group consisting of melamine polyphosphates, melamine pyrophosphates, ammonium polyphosphates.

In establishing a *prima facie* case of obviousness under 35 U.S.C. 103, it is incumbent upon the Examiner to provide a reason why one having ordinary skill in the art would have been led to combine references to arrive at the claimed invention. The requisite motivation must stem from some teaching, suggestion or interest in the prior art as a whole or from knowledge generally available to one having ordinary skill in the art. See

Uniroyal, Inc. v. Rudkin Riley, Corp., 837 F. 2d 1044, 5 USPQ 2d 1434 (Fed. Cir. 1988);
Ashland Oil, Inc. v. Delta Resin And Refractories, Inc., 776 F. 2d 281, 227 USPQ 657
(Fed. Cir. 1985).

Where claimed subject matter has been rejected as obvious in view of prior art references, a proper analysis under 35 U.S.C. 103 requires consideration of two factors: (1) whether the prior art would have suggested to those of ordinary skill in the art that they should make the claimed composite or device or carry out the claimed process; and (2) whether the prior art would also have revealed that in so making or carrying out the claimed invention those of ordinary skill would have a reasonable expectation of success. See *In Re Dow Chemical Company* 837 Fed. 2d 469, 473, 5 USPQ 2d 1529, 1531 (Fed. Cir. 1988). Both the suggestions and the reasonable expectation of success must be found in the prior art, not in Applicant's disclosure.

Appellants respectfully assert that such a suggestion and/or reasonable expectation of success could not be found in the cited references. Neither von Bonin, nor Valet et al., nor Susi, taken singularly or in combination, teach or suggest the claimed subject matter. Specifically, the applied references neither anticipate nor suggest a flame retardant resin coating comprising a flame retardant base resin and a transparent resin top layer, wherein the base resin comprises color pigments and from about 2.5 to about 50% by weight, based on the weight of the base resin, of at least one flame retardant additive selected from the group consisting of melamine polyphosphates, melamine pyrophosphates, ammonium polyphosphates, and mixtures thereof; and wherein the transparent resin comprises from about 0.5 to about 2% by weight, based on the weight of the transparent resin, of at least one sterically hindered amine.

The U.S. Patent and Trademark Office Board of Appeals and Interferences stated the following in *Ex parte Clapp*, 227 USPQ 972 (1985), at page 973:

Presuming arguendo that the references show the elements or concepts urged by the Examiner, the Examiner has presented no line of reasoning, and we know of none, as to why the artist when viewing only the collective teachings of the

references would have found it obvious to selectively pick and choose various elements and/or concepts from the several references relied on to arrive at the claimed invention. In the instant application, the Examiner has done little more than cite references to show that one or more elements or some combinations thereof, when each is viewed in a vacuum, is known. The claimed invention, however, is clearly directed to the combination of elements. That is to say, Applicant does not claim that he has invented one or more new elements but has presented claims to a new combination of elements. To support the conclusion of the claimed combination is directed to obvious subject matter, either the references must expressly or impliedly suggest the claimed combination where the Examiner must present a convincing line of reasoning as to why the artist would have found the claimed invention to have been obvious in light of the teaching of the references.

With the above directives, consideration must be given as to whether the combination of references in the manner set forth in the Office Action is proper to render the Appellant's invention obvious in view thereof.

As set forth hereinabove, Appellants respectfully assert that the references *do not* teach or suggest the combination as set forth in the claims, as is evident from the differences between Appellant's invention and the cited art. The benefit of the present invention must be seen in the unforeseen combination of a flame retardant containing base resin and a sterically hindered amine containing transparent resin top layer. Such a flame retardant resin coating is suitable for application to articles exposed to outdoor weathering or to humid, chemical or thermal conditions. There is simply nothing in the selected combination of references that would teach or suggest to one of ordinary skill in the art to make the claimed invention and have a reasonable expectation of success in doing so. Again, the combination of references must teach the claimed combination to render Appellant's claimed invention obvious under 35 U.S.C. 103.

It is urged that the Examiner is merely reconstructing the art in light of Appellant's disclosure by selecting and combining features from references where there is no suggestion in those references to do so. The point in time that is critical for an obviousness determination is at the time the invention. "To imbue one of ordinary skill in the art with knowledge of the invention in suit, when no prior art reference or references

of record convey or suggest that knowledge, is to fall victim to the insidious effect of a hindsight syndrome wherein that which only the inventor taught is used against its teacher." *W.L. Gore & Assocs., Inc. v. Garlock, Inc.*, 721 F.2d 1540, 1553, 220 USPQ 303, 312-13 (Fed. Cir. 1983).

Obviousness cannot be established by hindsight combination to produce the claimed invention. *In re Gorman*, 933 F.2d 982, 986, 18 USPQ2d 1885, 1888 (Fed.Cir.1991). It is the prior art itself, and not the Applicant's achievement, that must establish the obviousness of the combination.

Again, the present invention relates to a flame retardant resin coating comprising a flame retardant base resin and a transparent resin top layer. It provides a highly flame retardant material which also exhibits good results in the weathering tests. The structure is a key feature of the present invention, because it can provide a colored resin coating which can withstand severe weather conditions and which has a high resistance to fire. This is neither taught nor suggested in the applied references.

The invention cannot be deemed unpatentable merely because, in a hindsight attempt to reconstruct the invention, one can find elements of it in the art; it must be shown that the invention as a whole was obvious at the time the invention was made without knowledge of the claimed invention. 35 U.S.C. 103. Appellants submit that there is no teaching or suggestion in Von Bonin or Valet et al. which would inspire one skilled in the art to combine these references. To be sure, Von Bonin relates to fire resistant masses, while Valet et al. teaches coating materials which are resistant to light-induced degradation. These materials exist in different fields of art, and thus it is again urged that there is no motivation in the art to combine Von Bonin and Valet et al.

Similarly, it is urged that no teaching or suggestion exists which would inspire one skilled in the art to combine Susi with Von Bonin. Susi teaches a protective layer and method for stabilizing polymeric films, coatings, and articles against the actions of light,

moisture, and oxygen. Indeed, Susi does teach the possible use of a sterically hindered amine light stabilizer. However, there is still no teaching or suggestion in the cited art which would lead one to combine the fire resistant masses of Von Bonin with the protective layer of Susi. Obviousness cannot be established by combining the teachings of the prior art to produce the claimed invention, absent some teaching, suggestion or incentive supporting the combination." In re Geiger, 2 U.S.P.Q.2d 1276, 1278 (CAFC 1987). Like Valet et al., Susi relates to a different field of art than Von Bonin, and it is urged that there is no motivation to combine Susi with the Von Bonin to arrive at the instant invention.

The Examiner is of the position that portions of Appellant's disclosure in the current specification constitute prior art. This is incorrect. The disclosure cited by the Examiner is a description of Appellant's invention and not any admitted prior art.

The Examiner further states that it would have been obvious for one skilled in the art to replace the flame retardant compositions of Von Bonin with those taught by Appellants. Again, Appellants respectfully urge that the Examiner is impermissibly reconstructing the art in light of Appellant's disclosure. For these and the foregoing reasons, it is respectfully submitted that none of the applied references, either alone or in combination, teach or suggest the claimed invention. Accordingly, it is respectfully submitted that the rejection is improper and should be overruled. Such action is requested.

The Examiner has rejected claims 16 and 18-20 under 35 U.S.C. 103(a) over Von Bonin '527 in view of either Valet et al. or Susi, also in view of the Appellant's disclosure in the specification and further in view of WO 96/07678. It is respectfully submitted that the rejection is incorrect.

The arguments against Von Bonin, Valet et al. and Susi are repeated from above and apply equally here. With regard to WO 96/07678 (equivalent to U.S. patent 5,804,680), a single-component resin is described which is hardenable by UV radiation. Said resin consists of a phosphorus-containing acrylate, another unsaturated compound that may be

radically copolymerized with acrylates and a radical photo-initiator system. WO 96/07678 does not teach or suggest a coating comprising a flame retardant base resin and a transparent resin top layer, nor does WO 96/07678 describe the incorporation of a sterically hindered amine within such a transparent resin. In fact, the Examiner cites WO 96/07678 simply for its disclosure of polyurethane compositions. The Examiner states that it would have been obvious to one of ordinary skill in the art to use the polyurethane composition in WO 96/07678 as the polyurethane in von Bonin. In the first instance, it is respectfully submitted that such fails to overcome the deficiencies between the claimed invention and the combination of von Bonin with Valet et al. Susi and Appellant's disclosure. Additionally, it is again respectfully submitted that the Examiner is reconstructing the art in light of Appellant's disclosure. Where Appellant's teachings are needed to find the invention, the invention is not obvious.

Obviousness cannot be determined solely after reading Appellant's teaching. Citing references that merely indicate that isolated parts recited in the claims are known is not a sufficient basis for a conclusion of obviousness; there must be something that suggests the desirability of combining the references in a manner calculated to arrive at the claimed invention. Ex parte Hiyamizu, 10 U.S.P.Q.2d 1393, 1394 (PTO Bd. Pat. Ap. and Int., 1988). There is simply nothing in WO 96/07678 or von Bonin that suggests to one skilled in the art that the references should be combined, or more particularly, combined with the other cited references to form Applicant's invention with a reasonable expectation of success. Furthermore, it is urged that the belief that one skilled in the art could form the claimed multilayered film does not suggest that one should form such a film to obtain the disclosed benefits. For these reasons, it is respectfully submitted that the rejection is improper and should be withdrawn.

The Examiner has rejected claims 16 and 18-20 under 35 U.S.C. 103(a) over von Bonin '527 in view of either Valet et al. or Susi, also in view of the Appellant's disclosure in the specification and further in view of Japanese publication JP 402178359A to Kawakami et al. It is respectfully submitted that the rejection is incorrect.

The arguments with respect to von Bonin, Valet et al., Susi and Appellant's disclosure apply equally herein and are repeated from above. With regard to JP 402178359A, a coating composition is disclosed which is a combination of specific polyfunctional urethane acrylate, a polyfunctional monomer and a phosphate-base (meth)acrylate monomer. JP 402178359A does not teach or suggest a coating comprising a flame retardant base resin and a transparent resin top layer, nor does JP 402178359A describe the incorporation of a sterically hindered amine within such a transparent resin. In fact, the Examiner cites JP 402178359A simply for its disclosure of polyurethane compositions.

The Examiner states that it would have been obvious to one of ordinary skill in the art to use the polyurethane composition in JP 402178359A as the polyurethane in von Bonin. In the first instance, it is respectfully submitted that such fails to overcome the deficiencies between the claimed invention and the combination of von Bonin with Valet et al. Susi and Appellant's disclosure. Additionally, it is again respectfully submitted that the Examiner is reconstructing the art in light of Appellant's disclosure. There is simply nothing in JP 402178359A or von Bonin that suggests to one skilled in the art that the references should be combined, or more particularly, combined with the other cited references to form Appellant's invention with a reasonable expectation of success. Furthermore, it is urged that the belief that one skilled in the art could form the claimed multilayered film does not suggest that one should form such a film to obtain the disclosed benefits.

In response to the arguments submitted on June 24, 2003, the Examiner states that there is sufficient motivation to combine the references found in the secondary references because protective coatings are shown. It is respectfully submitted that this is insufficient motivation for combining the applied references. Again, to support the conclusion of the claimed combination is directed to obvious subject matter, *the references* must expressly or impliedly suggest the claimed combination where the Examiner must present a convincing line of reasoning as to why the artist would have found the claimed invention to have been obvious in light of the teaching of the references. The Examiner has failed

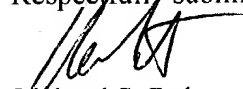
to show how Appellant's new combination of elements is obvious based on a combination of the applied references. The Examiner has done little more than cite references to show that one or more elements or some combinations thereof, when each is viewed in a vacuum, is known. In determining the differences between the prior art and the claims, the question under 35 U.S.C. 103 is not whether the differences themselves would have been obvious, but whether the claimed invention as a whole would have been obvious. *Stratoflex, Inc. v. Aeroquip Corp.*, 713 F.2d 1530, 218 USPQ 871 (Fed. Cir. 1983); *Schneck v. Nortron Corp.*, 713 F.2d 782, 218 USPQ 698 (Fed. Cir. 1983). It is respectfully asserted that the invention as a whole would not have been obvious to one of ordinary skill in the art at the time the invention was made.

Surely, some of the individual components included within the scope of the present invention have been used before in the art. Broad categories of flame retardant materials are all known. However, the presently claimed *structure* in particular has not been heretofore known in the art, namely: a flame retardant containing base resin and a sterically hindered amine containing transparent resin top layer. This particular combination of features is not shown or suggested in the applied art and the examples of the application show the unexpected improvement achieved by this combination. In this regard, the Board's attention is particularly drawn to Table 1, which shows features of the inventive resin coatings with flame retardant additives. The data of Table 1 shows that the inventive resin coatings passed weathering tests (natural sunlight, UV-B radiation, condensation, and climate tests) without the occurrence of resulting cracks or fissures. Further, Table 2 summarizes comparative examples of resin coatings with nonreactive additives and electron beam curable additives. Table 2's data clearly shows the formation of cracks and the presence of flooding, resulting from the same weathering tests as were performed on the inventive resin coatings. In addition to the unexpected performance advantages of the inventive resin coatings, these coatings also provide substantial monetary savings to manufacturers and consumers alike. Again, it is urged that while some of the references cited by the examiner may show one or more of the individual components of the present invention, it is urged that the examiner then leaps to the conclusion that, in effect, all components of the invention herein claimed are

therefore *prima facie* obvious. This is certainly not the case. The particular structure taught by this invention is not suggested by the art, and the unexpected improvement is likewise not suggested.

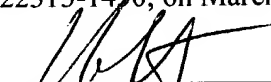
For the foregoing reasons, it is respectfully submitted that all of the rejection under 35 U.S.C. 103 are improper and should be overruled. Such action is respectfully requested.

Respectfully submitted,



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Date: March 19, 2004

I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail, postage pre-paid in an envelope addressed to Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450, on March 19, 2004.


Richard S. Roberts

IX. APPENDIX

1. A flame retardant resin coating comprising a flame retardant base resin and a transparent resin top layer, wherein the base resin comprises color pigments and from about 2.5 to about 50% by weight, based on the weight of the base resin, of at least one flame retardant additive selected from the group consisting of melamine polyphosphates, melamine pyrophosphates, ammonium polyphosphates, and mixtures thereof; and wherein the transparent resin comprises from about 0.5 to about 2% by weight, based on the weight of the transparent resin, of at least one sterically hindered amine.
2. The flame retardant resin coating of claim 1, wherein the base resin is selected from the group consisting of polyester, polyether, epoxy, polyurethane, acrylic acrylates, melamine acrylates, and silicone (meth)acrylates.
3. The flame retardant resin coating of claim 2, wherein the base resin comprises phosphorus-containing polyurethanes obtained by copolymerizing a polymer precursor with monomers, said polymer precursor comprising:
 - a) a polymerizable unsaturated bond;
 - b) an oxycarbonyl or iminocarbonyl group;
 - c) a free hydroxyl group or a functional group obtainable by reacting a free hydroxyl group with an appropriate electrophile; and
 - d) a terminal group, containing phosphorus and oxygen, at the end of a carbon chain, and at least one group selected from a phosphorus hydroxyl group and, optionally, a substituted hydrocarbyl group connected via an oxy group to a phosphorus atom, and being substantially free from halogen-containing groups and having a molecular weight (mass number M_n for a polymer) of from about 200 to about 5000 daltons, and, optionally, a viscosity of less than about 14,000 mPa. s.
4. The flame retardant resin coating of claim 2, wherein the base resin comprises phosphorus-containing polyurethanes obtained by copolymerizing an organic compound or a polymer with monomers, said organic compound or polymer comprising at least one

unsubstituted or substituted cycloalkoxy group in which at least one of the ring atoms is oxygen, the cycloalkoxy group being connected to at least one unsubstituted or α -substituted alkylencarbonyloxy group having at least one active hydrogen atom α to the carbonyl group, wherein

a) at least one cycloalkoxy group may optionally react with a phosphate ester to form a terminal phosphate ester group which possesses a hydroxyl group on the β carbon atom; and/or

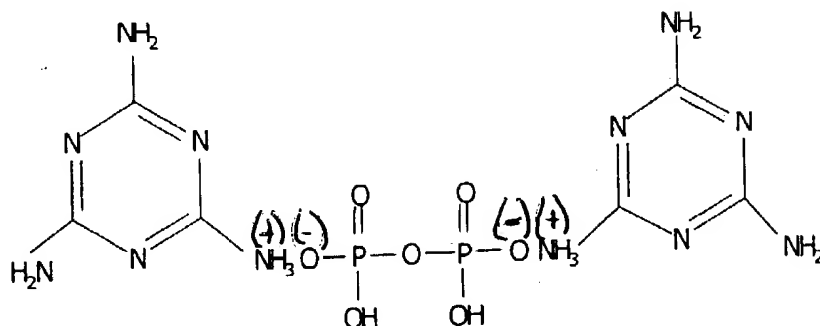
b) at least one alkylene carbonyl group may optionally react with a H-phosphonate ester to form a terminal phosphonate ester group β to a carbonyloxy group, and, optionally, at least one cycloalkoxy group may react with a carboxylic acid group conjugated with an unsaturated group, to form a carbonyloxyhydroxyalkyl group which is adjacent to an unsaturated carbon bond, and, in one or both cases, the resultant product contains at least one phosphorus atom, at least one hydroxyl group and at least one polymerizable unsaturated carbon bond.

5. The flame retardant resin coating of claim 1, wherein the transparent resin contains from about 0.5 to about 5% by weight, based on the weight of the transparent resin, of at least one UV absorber.

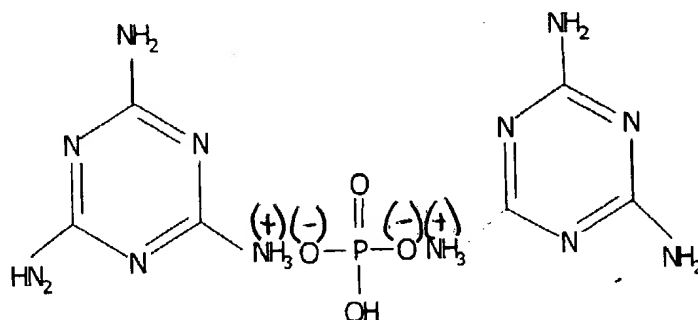
6. The flame retardant resin coating of claim 1, comprising a melamine polyphosphate of formula $(C_3H_8N_6)_n \cdot (HPO_3)_m$, where n and m are natural numbers and the molar ratio of phosphorus to melamine ranges from about 1:0.5 to about 1:3.

7. The flame retardant resin coating of claim 1, comprising a melamine polyphosphate of formula $(C_3H_8N_6)_n \cdot (HPO_3)_m$, where n and m are natural numbers and the molar ratio of phosphorus to melamine ranges from about 1:1 to about 1.5:1.

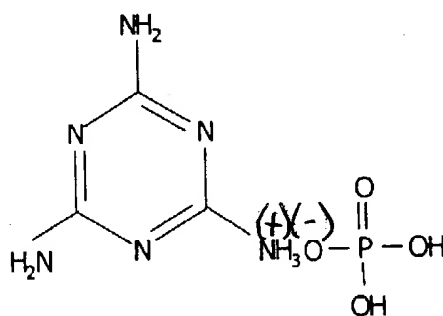
8. The flame retardant resin coating of claim 1, comprising a dimelamine pyrophosphate of structural formula:



9. The flame retardant resin coating of claim 1, comprising a dimelamine orthophosphate of structural formula:



10. The flame retardant resin coating of claim 1, comprising a monomelamine orthophosphate of structural formula:



11. The flame retardant resin coating of claim 1, wherein the particles of ammonium polyphosphate are microencapsulated in a resin whose water solubility ranges from about 0.06 to about 0.19 g/100 g water at a temperature

of about 20°C.

12. The flame retardant resin coating of claim 1, wherein the flame retardant additives have a phosphorus content of from about 2.5 to about 50% by weight, based on the weight of the respective additive.

13. The flame retardant resin coating of claim 5, wherein the UV absorber comprises triazine, benzylidene-malonate, hydroxyphenylbenzotriazoles, 2-hydroxybenzophenones or oxalanilide.

14. The flame retardant resin coating of claim 13, wherein a UV absorber comprising hydroxyphenyl-s-triazine is present in the transparent resin at from about 0.5 to about 5% by weight, based on the weight of the transparent resin.

15. The flame retardant resin coating of claim 14, wherein hydroxyphenyl-s-triazine is present at 1 to 4 % by weight in the transparent resin.

16. The flame retardant resin coating of claim 1, wherein the base resin comprises a polyurethane (meth)acrylate which is prepared by reacting a polyurethane with a compound containing at least one phosphorus-containing group, at least one (meth)acrylate group, and at least one functional group which reacts with at least one end group of the polyurethane to form a covalent bond.

17. The flame retardant resin coating of claim 16, wherein the phosphorus-containing group comprises a phosphate or phosphonate group.

18. The flame retardant resin coating of claim 16, wherein the (meth)acrylate group is part of a (meth)acryloyloxy group.

19. The flame retardant resin coating of claim 16, wherein the functional group which reacts with an end group of the polyurethane to form a

covalent bond comprises a hydroxyl group.

20. The flame retardant resin coating of claim 18 wherein the polyurethane (meth)acrylate comprises from about 1 to about 3 (meth)acryloyloxy groups.

21. The flame retardant resin coating of claim 1, wherein the base resin comprises at least one flame retardant additive selected from the group consisting of salts of phosphorous acid, a phosphonic acid, a phosphonous acid, a phosphinic acid and/or a phosphinous acid with ammonia and melamine.

22. The flame retardant resin coating of claim 1, wherein the base resin comprises at least one flame retardant additive selected from the group consisting of poly salts and pyro salts of phosphorous acid, a phosphonic acid, and/or a phosphonous acid with ammonia and melamine.

23. The flame retardant resin coating of claim 1, wherein the base coating material comprises color pigments which provide an initial coloration to the resin coating, and wherein said initial coloration may undergo a color change comprising a maximum color difference, dE, of from about 0.5 to about 2.0 from the initial coloration.

24. An article comprising a substrate, and the flame retardant resin coating of claim 1 on the substrate.